



## SEQUENCE LISTING

&lt;110&gt; Georgopoulos, Katia

<120> IKAROS REGULATORY ELEMENTS AND USES  
THEREOF

&lt;130&gt; 10287-067001

&lt;140&gt; US 09/755,830

&lt;141&gt; 2001-01-05

&lt;150&gt; US 08/283,300

&lt;151&gt; 1994-07-29

&lt;150&gt; US 08/238,212

&lt;151&gt; 1994-05-02

&lt;150&gt; US 08/121,438

&lt;151&gt; 1993-09-14

&lt;150&gt; US 07/946,233

&lt;151&gt; 1992-09-14

&lt;160&gt; 43

&lt;170&gt; FastSEQ for Windows Version 4.0

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$a^3$ 

1. The first step is to identify the problem. This involves understanding the current situation and what needs to be changed.

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cgt Arg 145	aag Lys	agc Ser	tct Ser	atg Met	cct Pro 150	cag Gln	aaa Lys	ttt Phe	ctt Leu	gga Gly 155	gac Asp	aag Lys	tgc Cys	ctg Leu 160	tca Ser	480
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# 2025年12月25日

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# 1. Introduction

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Ser	Gly	Glu	Lys	Pro	Phe	Lys	Cys	His	Leu	Cys	Asn	Tyr	Ala	Cys	Arg	
		115					120					125				
Arg	Arg	Asp	Ala	Leu	Thr	Gly	His	Leu	Arg	Thr	His	Ser	Val	Gly	Lys	
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Pro	His	Lys	Cys	Gly	Tyr	Cys	Gly	Arg	Ser	Tyr	Lys	Gln	Arg	Thr	Ser	
145					150					155					160	
Leu	Glu	Glu	His	Lys	Glu	Arg	Cys	His	Asn	Tyr	Leu	Glu	Ser	Met	Gly	
				165					170					175		
Leu	Pro	Gly	Thr	Leu	Tyr	Pro	Val	Ile	Lys	Glu	Glu	Thr	Lys	His	Ser	
			180					185					190			
Glu	Met	Ala	Glu	Asp	Leu	Cys	Lys	Ile	Gly	Ser	Glu	Arg	Ser	Leu	Val	
		195					200					205				
Leu	Asp	Arg	Leu	Ala	Ser	Asn	Val	Ala	Lys	Arg	Lys	Ser	Ser	Met	Pro	
	210					215					220					
Gln	Lys	Phe	Leu	Gly	Asp	Lys	Gly	Leu	Ser	Asp	Thr	Pro	Tyr	Asp	Ser	
225					230					235				240		
Ala	Thr	Tyr	Glu	Lys	Glu	Asn	Glu	Met	Met	Lys	Ser	His	Val	Met	Asp	
				245					250					255		
Gln	Ala	Ile	Asn	Asn	Ala	Ile	Asn	Tyr	Leu	Gly	Ala	Glu	Ser	Leu	Arg	
			260					265					270			
Pro	Leu	Val	Gln	Thr	Pro	Pro	Gly	Gly	Ser	Glu	Val	Val	Pro	Val	Ile	
		275					280					285				
Ser	Pro	Met	Tyr	Gln	Leu	His	Arg	Arg	Ser	Glu	Gly	Thr	Pro	Arg	Ser	
	290					295					300					
Asn	His	Ser	Ala	Gln	Asp	Ser	Ala	Val	Glu	Tyr	Leu	Leu	Leu	Leu	Ser	
305					310					315					320	
Lys	Ala	Lys	Leu	Val	Pro	Ser	Glu	Arg	Glu	Ala	Ser	Pro	Ser	Asn	Ser	
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<213> Mus musculus
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 4. *Chlorophyll d* (Chl *d*)  
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 7. *Chlorophyll g* (Chl *g*)  
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 39. *Chlorophyll am* (Chl *am*)  
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Asn	His	Ser	Ala	Gln	Asp	Ala	Val	Asp	Asn	Leu	Leu	Leu	Leu	Ser	Lys
		275					280					285			
Ala	Lys	Ser	Val	Ser	Ser	Glu	Arg	Glu	Ala	Ser	Pro	Ser	Asn	Ser	Cys
		290				295					300				
Gln	Asp	Ser	Thr	Asp	Thr	Glu	Ser	Asn	Ala	Glu	Glu	Gln	Arg	Ser	Gly
305					310					315					320
Leu	Ile	Tyr	Leu	Thr	Asn	His	Ile	Asn	Pro	His	Ala	Arg	Asn	Gly	Leu
				325					330					335	
Ala	Leu	Lys	Glu	Glu	Gln	Arg	Ala	Tyr	Glu	Val	Leu	Arg	Ala	Ala	Ser
			340					345					350		
Glu	Asn	Ser	Gln	Asp	Ala	Phe	Arg	Val	Val	Ser	Thr	Ser	Gly	Glu	Gln
		355					360					365			
Leu	Lys	Val	Tyr	Lys	Cys	Glu	His	Cys	Arg	Val	Leu	Phe	Leu	Asp	His
	370					375					380				
Val	Met	Tyr	Thr	Ile	His	Met	Gly	Cys	His	Gly	Cys	His	Gly	Phe	Arg
385					390					395					400
Asp	Pro	Phe	Glu	Cys	Asn	Met	Cys	Gly	Tyr	His	Ser	Gln	Asp	Arg	Tyr
				405					410					415	
Glu	Phe	Ser	Ser	His	Ile	Thr	Arg	Gly	Glu	His	Arg	Tyr	His	Leu	Ser
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Ser	Pro	Pro	Val	Ser	Asp	Thr	Pro	Asp 25	Glu	Gly	Asp	Glu	Pro	Met	Pro
Val	Pro	Glu	Asp	Leu	Ser	Thr	Thr	Ser	Gly	Ala	Gln	Gln	Asn	Ser	Lys
			35				40					45			
Ser	Asp	Arg	Gly	Met	Ala	Ser	Asn	Val	Lys	Val	Glu	Thr	Gln	Ser	Asp
			50				55				60				
Glu 65	Glu	Asn	Gly	Arg	Ala	Cys	Glu	Met	Asn	Gly	Glu	Glu	Cys	Ala	Glu
					70					75					80
Asp	Leu	Arg	Met	Leu	Asp	Ala	Ser	Gly	Glu	Lys	Met	Asn	Gly	Ser	His
				85					90					95	
Arg	Asp	Gln	Gly	Ser	Ser	Ala	Leu	Ser	Gly	Val	Gly	Gly	Ile	Arg	Leu
			100					105					110		
Pro	Asn	Gly	Lys	Leu	Lys	Cys	Asp	Ile	Cys	Gly	Ile	Val	Cys	Ile	Gly
			115				120					125			
Pro	Asn	Val	Leu	Met	Val	His	Lys	Arg	Ser	His	Thr	Gly	Glu	Arg	Pro
			130			135					140				
Phe 145	Gln	Cys	Asn	Gln	Ser	Gly	Ala	Ser	Phe	Thr	Gln	Lys	Gly	Asn	Leu
					150					155					160
Leu	Arg	His	Ile	Lys	Leu	His	Ser	Gly	Glu	Lys	Pro	Phe	Lys	Cys	His
				165					170					175	
Leu	Cys	Asn	Tyr	Ala	Cys	Arg	Arg	Arg	Asp	Ala	Leu	Thr	Gly	His	Leu
			180				185					190			
Arg	Thr	His	Ser	Val	Gly	Lys	Pro	His	Lys	Cys	Gly	Tyr	Cys	Gly	Arg
			195				200					205			
Ser	Tyr	Lys	Gln	Arg	Ser	Ser	Leu	Glu	Glu	His	Lys	Glu	Arg	Cys	His
			210			215					220				
Asn 225	Tyr	Leu	Glu	Ser	Met	Gly	Leu	Pro	Gly	Val	Cys	Pro	Val	Ile	Lys
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<211> 390
<212> PRT
<213> Mus musculus
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Ser	Pro	Pro	Val	Ser	Asp	Thr	Pro	Asp	Glu	Gly	Asp	Glu	Pro	Met	Pro
			20					25					30		
Val	Pro	Glu	Asp	Leu	Ser	Thr	Thr	Ser	Gly	Ala	Gln	Gln	Asn	Ser	Lys
		35				40						45			
Ser	Asp	Arg	Gly	Met	Gly	Glu	Arg	Pro	Phe	Gln	Cys	Asn	Gln	Ser	Gly
	50					55				60					
Ala	Ser	Phe	Thr	Gln	Lys	Gly	Asn	Leu	Leu	Arg	His	Ile	Lys	Leu	His
65					70					75				80	
Ser	Gly	Glu	Lys	Pro	Phe	Lys	Cys	His	Leu	Cys	Asn	Tyr	Ala	Cys	Arg
				85					90					95	
Arg	Arg	Asp	Ala	Leu	Thr	Gly	His	Leu	Arg	Thr	His	Ser	Val	Ile	Lys
			100					105					110		

<400> 42															
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Ser	Pro	Pro	Val	Ser	Asp	Thr	Pro	Asp	Glu	Gly	Asp	Glu	Pro	Met	Pro
			20					25					30		
Val	Pro	Glu	Asp	Leu	Ser	Thr	Thr	Ser	Gly	Ala	Gln	Gln	Asn	Ser	Lys
		35				40						45			
Ser	Asp	Arg	Gly	Met	Ala	Ser	Asn	Val	Lys	Val	Glu	Thr	Gln	Ser	Asp
	50					55				60					
Glu	Glu	Asn	Gly	Arg	Ala	Cys	Glu	Met	Asn	Gly	Glu	Glu	Cys	Ala	Glu
65				70						75				80	
Asp	Leu	Arg	Met	Leu	Asp	Ala	Ser	Gly	Glu	Lys	Met	Asn	Gly	Ser	His
				85					90					95	
Arg	Asp	Gln	Gly	Ser	Ser	Ala	Leu	Ser	Gly	Val	Gly	Gly	Ile	Arg	Leu
			100					105					110		

Pro Asn Gly Lys Leu Lys Cys Asp Ile Cys Gly Ile Val Cys Ile Gly  
 115 120 125  
 Pro Asn Val Leu Met Val His Lys Arg Ser His Thr Gly Asp Lys Cys  
 130 135 140  
 Leu Ser Asp Met Pro Tyr Asp Ser Ala Asn Tyr Glu Lys Glu Asp Met  
 145 150 155 160  
 Met Thr Ser His Val Met Asp Gln Ala Ile Asn Asn Ala Ile Asn Tyr  
 165 170 175  
 Leu Gly Ala Glu Ser Leu Arg Pro Leu Val Gln Thr Pro Pro Gly Ser  
 180 185 190  
 Ser Glu Val Val Pro Val Ile Ser Ser Met Tyr Gln Leu His Lys Pro  
 195 200 205  
 Pro Ser Asp Gly Pro Pro Arg Ser Asn His Ser Ala Gln Asp Ala Val  
 210 215 220  
 Asp Asn Leu Leu Leu Leu Ser Lys Ala Lys Ser Val Ser Ser Glu Arg  
 225 230 235 240  
 Glu Ala Ser Pro Ser Asn Ser Cys Gln Asp Ser Thr Asp Thr Glu Ser  
 245 250 255  
 Asn Ala Glu Glu Gln Arg Ser Gly Leu Ile Tyr Leu Thr Asn His Ile  
 260 265 270  
 Asn Pro His Ala Arg Asn Gly Leu Ala Leu Lys Glu Glu Gln Arg Ala  
 275 280 285  
 Tyr Glu Val Leu Arg Ala Ala Ser Glu Asn Ser Gln Asp Ala Phe Arg  
 290 295 300  
 Val Val Ser Thr Ser Gly Glu Gln Leu Lys Val Tyr Lys Cys Glu His  
 305 310 315 320  
 Cys Arg Val Leu Phe Leu Asp His Val Met Tyr Thr Ile His Met Gly  
 325 330 335  
 Cys His Gly Cys His Gly Phe Arg Asp Pro Phe Glu Cys Asn Met Cys  
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 Gly Tyr His Ser Gln Asp Arg Tyr Glu Phe Ser Ser His Ile Thr Arg  
 355 360 365  
 Gly Glu His Arg Tyr His Leu Ser  
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<210> 43  
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 <212> PRT  
 <213> Mus musculus

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 Phe Lys Cys His Leu Cys Asn Tyr Ala Cys Arg Arg Asp Ala Leu  
 35 40 45  
 Thr Gly His Leu Arg Thr His Ser Val Ile Lys Glu Glu Thr Lys His  
 50 55 60  
 Ser Glu Met Ala Glu Asp Leu Cys Lys Ile Gly Ser Glu Arg Ser Leu  
 65 70 75 80  
 Val Leu Asp Arg Leu Ala Ser Asn Val Ala Lys Arg Lys Ser Ser Met  
 85 90 95  
 Pro Gln Lys Phe Leu Gly Asp Lys Gly Leu Ser Asp Thr Pro Tyr Asp  
 100 105 110  
 Ser Ala Thr Tyr Glu Lys Glu Asn Glu Met Met Lys Ser His Val Met  
 115 120 125

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Asp	Gln	Ala	Ile	Asn	Asn	Ala	Ile	Asn	Tyr	Leu	Gly	Ala	Glu	Ser	Leu
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Arg	Pro	Leu	Val	Gln	Thr	Pro	Pro	Gly	Gly	Ser	Glu	Val	Val	Pro	Val
145					150					155					160
Ile	Ser	Pro	Met	Tyr	Gln	Leu	His	Arg	Arg	Ser	Glu	Gly	Thr	Pro	Arg
				165					170					175	
Ser	Asn	His	Ser	Ala	Gln	Asp	Ser	Ala	Val	Glu	Tyr	Leu	Leu	Leu	Leu
			180					185					190		
Ser	Lys	Ala	Lys	Leu	Val	Pro	Ser	Glu	Arg	Glu	Ala	Ser	Pro	Ser	Asn
	195						200					205			
Ser	Cys	Gln	Asp	Ser	Thr	Asp	Thr	Glu	Ser	Asn	Asn	Glu	Glu	Gln	Arg
	210					215					220				
Ser	Gly	Leu	Ile	Tyr	Leu	Thr	Asn	His	Ile	Ala	Arg	Arg	Ala	Gln	Arg
225					230					235					240
Val	Ser	Leu	Lys	Glu	Glu	His	Arg	Ala	Tyr	Asp	Leu	Leu	Arg	Ala	Ala
			245						250					255	
Ser	Glu	Asn	Ser	Gln	Asp	Ala	Leu	Arg	Val	Val	Ser	Thr	Ser	Gly	Glu
		260						265				270			
Gln	Met	Lys	Val	Tyr	Lys	Cys	Glu	His	Cys	Arg	Val	Leu	Phe	Leu	Asp
		275					280					285			
His	Val	Met	Tyr	Thr	Ile	His	Met	Gly	Cys	His	Gly	Phe	Arg	Asp	Pro
	290					295					300				
Phe	Glu	Cys	Asn	Met	Cys	Gly	Tyr	His	Ser	Gln	Asp	Arg	Tyr	Glu	Phe
305					310					315					320
Ser	Ser	His	Ile	Thr	Arg	Gly	Glu	His	Arg	Phe	His	Met	Ser		
				325					330						

013  
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